IFNet
International Flood Network

An Introduction of
Global Flood Alert System (GFAS)

November 6, 2006
at 6th GPM Planning Workshop

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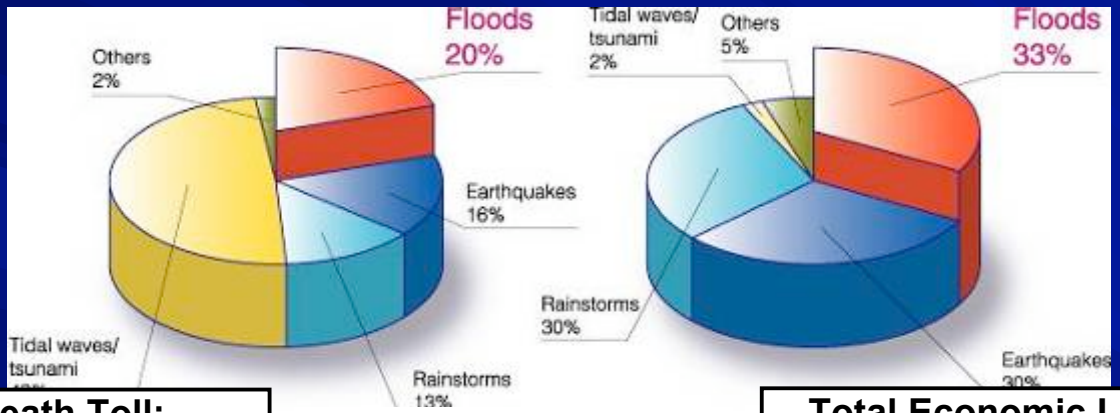
I Backgrounds

Target: Reduction of Human Loss

World's natural disaster (1995-2004)



Total Death Toll:
(about 470,000 people)

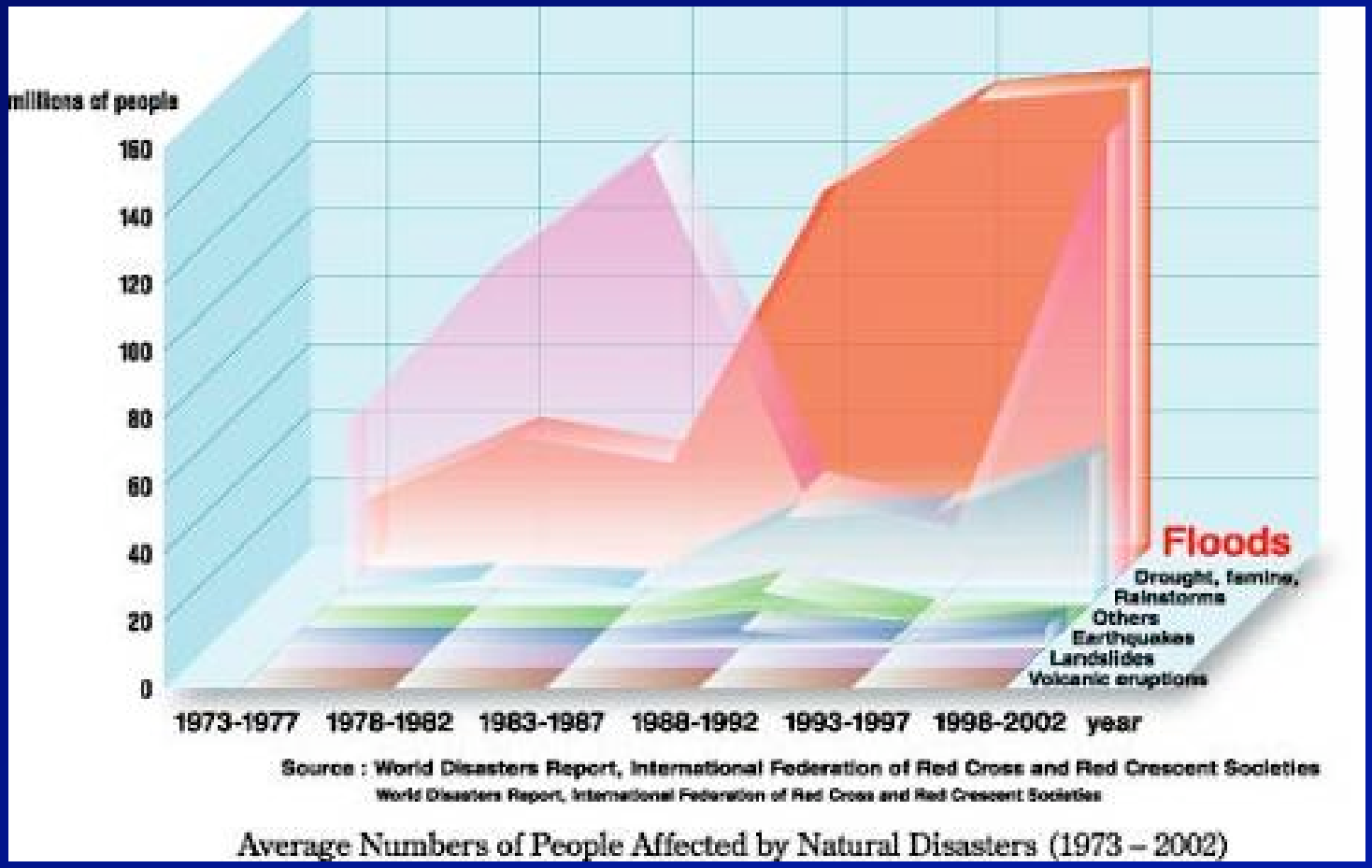
Source: EM-DAT, CRED

Total Economic Loss:
(about 49 billion. US$)

- **Tidal waves/Tsunami 49%**
- **Floods 20%**
- **Earthquakes 16%**

Statistics of Flood Disasters

Average Numbers of People Affected by Natural Disasters (1973-2002)



Source: "World Disaster Report 2004", International Federation of Red Cross and Red Crescent Societies

Measures to Reduce Human Loss

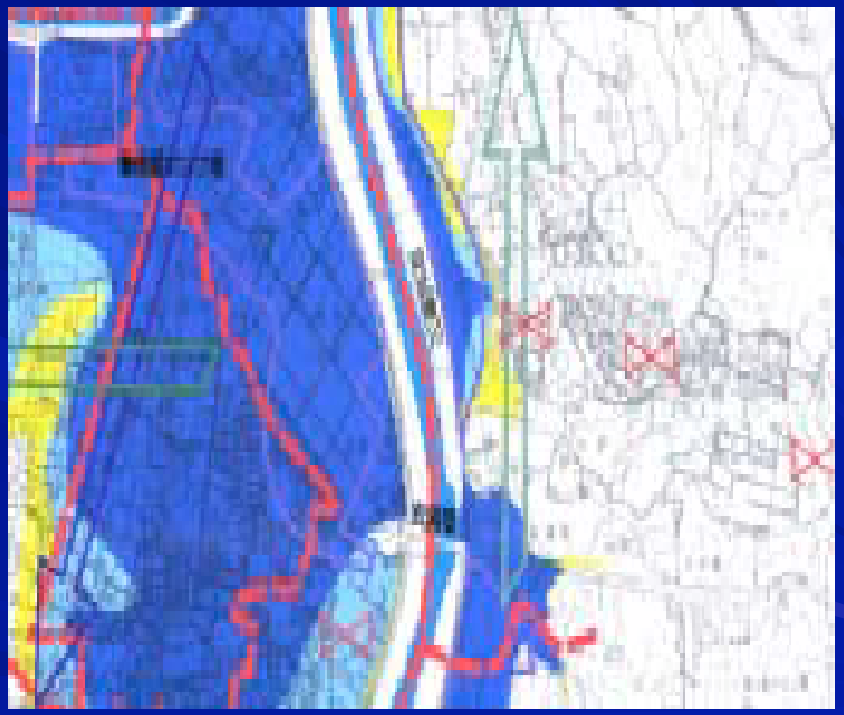
- Structural Measures:

  Levee, Flood Control Dam, Flood Way, Retarding Basin, etc.

- Non-structural Measures:

  1. In Emergency (Early Warning System)
     - Flood Forecasting
     - Flood Warning
     - Evacuation Advice/Order
  2. In Normal Time
     - Flood Hazard Map
     - Flood Fighting Drill,

Flood Hazard Map



Challenges for Flood Forecasting

2002 flood of Vltava (Moldau) river
Left bank in the vicinity of the Japanese Embassy)
During flood on August 14 (right photo), and peacetime on September 4 (left photo)

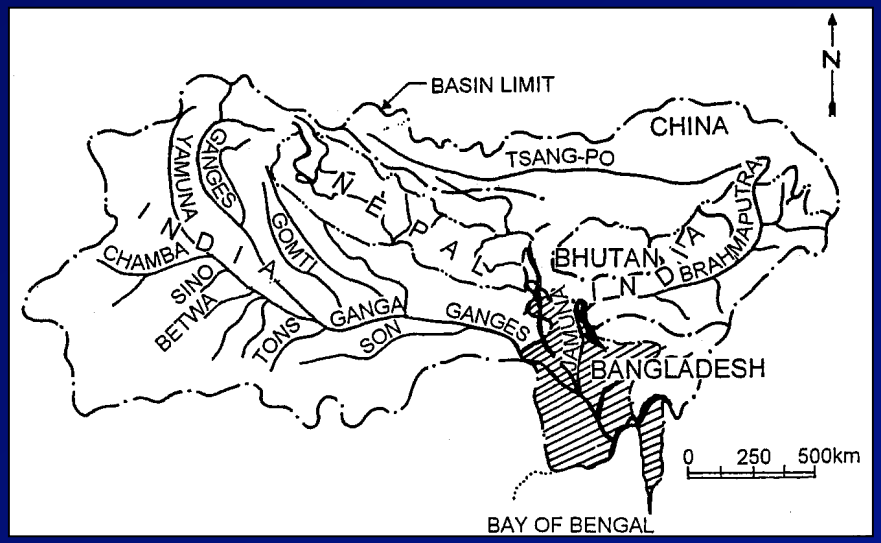
Photo: Tomio Tatsuki, first secretary of Japanese Embassy in Czech

To reduce human loss in relatively the short term, establishment of EWS with flood forecasting is a effective way. However a lot of river basins are confronted with challenges setting up FFS .

- O&M cost etc. for telemetry (compensated with satellite data)
- Data Transmission in Trans-boundary Rivers (compensated with satellite data)
- Accurate Forecasting for Flash Flood in small/middle rivers

→ Other means of data transmission than telemetry:
Community Participation, Cell-phone, Satellite Rainfall, etc.

Floods in Bangladesh



Ganges-Bramaputra-Meghna (GBM) River Basin Source: JICA

Situation of Bangladesh

- Located downstream delta
- 10% of GBM river basin
- Upstream (India, Nepal, Bhutan, China)
- No hydrological information of upstream countries except ones close to border

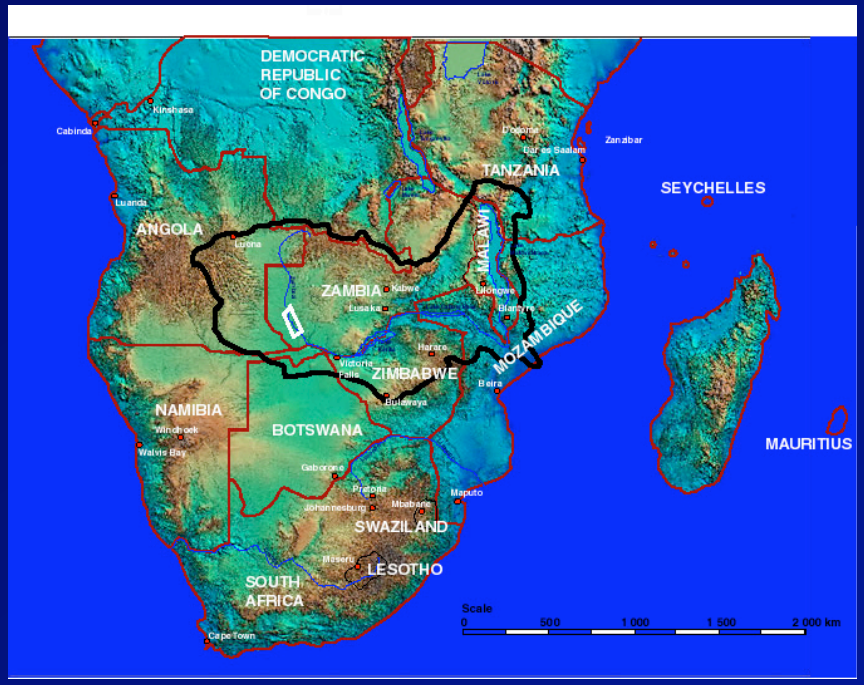
2004 Flood

Two young girls push a pot full of relief food as they swim back to their submerged homes at the downtown of Dhaka July 25 while flood victims queue up before a homoeopathic dispensary at the neighbouring locality as the government is yet to offer healthcare service.

Courtesy — New Age

Photo: Mr. Shahidul Islam Chowdhury, BANGLADESH

Floods in Mozambique



The Zambezi River and Situation of Mozambique

- Fourth largest river basin in Africa
- Located downstream most
- Upstream (Malawi, Tanzania, Zambia, Dem. Rep. of Congo, Botswana, Namibia)

2002 Flood in the Zambezi River

Photo, Map: Dr. Imasiku A. Nyambe, University of Zambia

II GFAS
Schematic Figure of GFAS

IFNet International Flood Network

i) Space Agencies

NASA Homepage

Observation Satellites

Heavy rainfall around
In the XX river basin

River

ii) IDI-Japan

Data Download

Data Processing

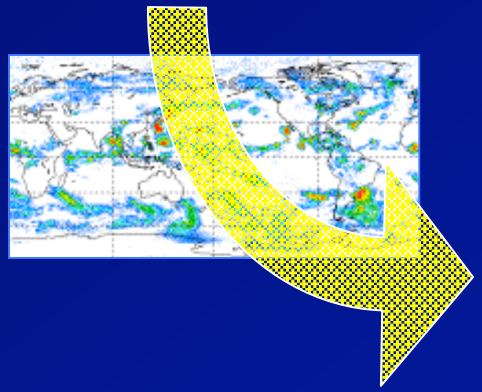
Mapping, Email

System Development

iv) Hydrological Service

River Authorities

Flood Forecasting and Warning
using GFAS Information etc.



iii) IFNet

1. IFNet Homepage
2. Email of Heavy Rain
   to IFNet members in charge of Flood Forecasting and Warning

System Concept of GFAS

1. Collaboration with

   i) Space Agencies as rainfall data provider

   ii) IDI as rainfall analyzer, system developer, alerting information provider

   iii) IFNet as transmission network

   iv) Hydrological Services , River Authorities in charge of flood forecasting and warning

2. Objectives

   - Practical Use for FEW system
   - Raising awareness of the importance of FEW

Expectations for Satellite Rainfall

Satellite rainfall is expected to perform in:

- making up for the absence of real time data,
- diversifying hydrological data source,
- providing ocean area data,
- improving accuracy of existing flood forecasting system by its three dimensional observation,
- others.

especially in river basins with:

- large river basins which is far larger than 3B42RT's mesh, and which have much longer run-off than 3B42RT's data delivery time lag,
- without any telemetry systems
- trans-boundary rivers where prompt data transmission across boundaries is difficult.

III 1st Phase Launch of GFAS

- Purpose: Verification of satellite rainfall in flood forecasting
- Data source: NASA “3B42RT”
- GFAS information

1) Publicized information on IFNet website

- Global and regional rainfall map with heavy rain area
- Text data

2) Customized information on request

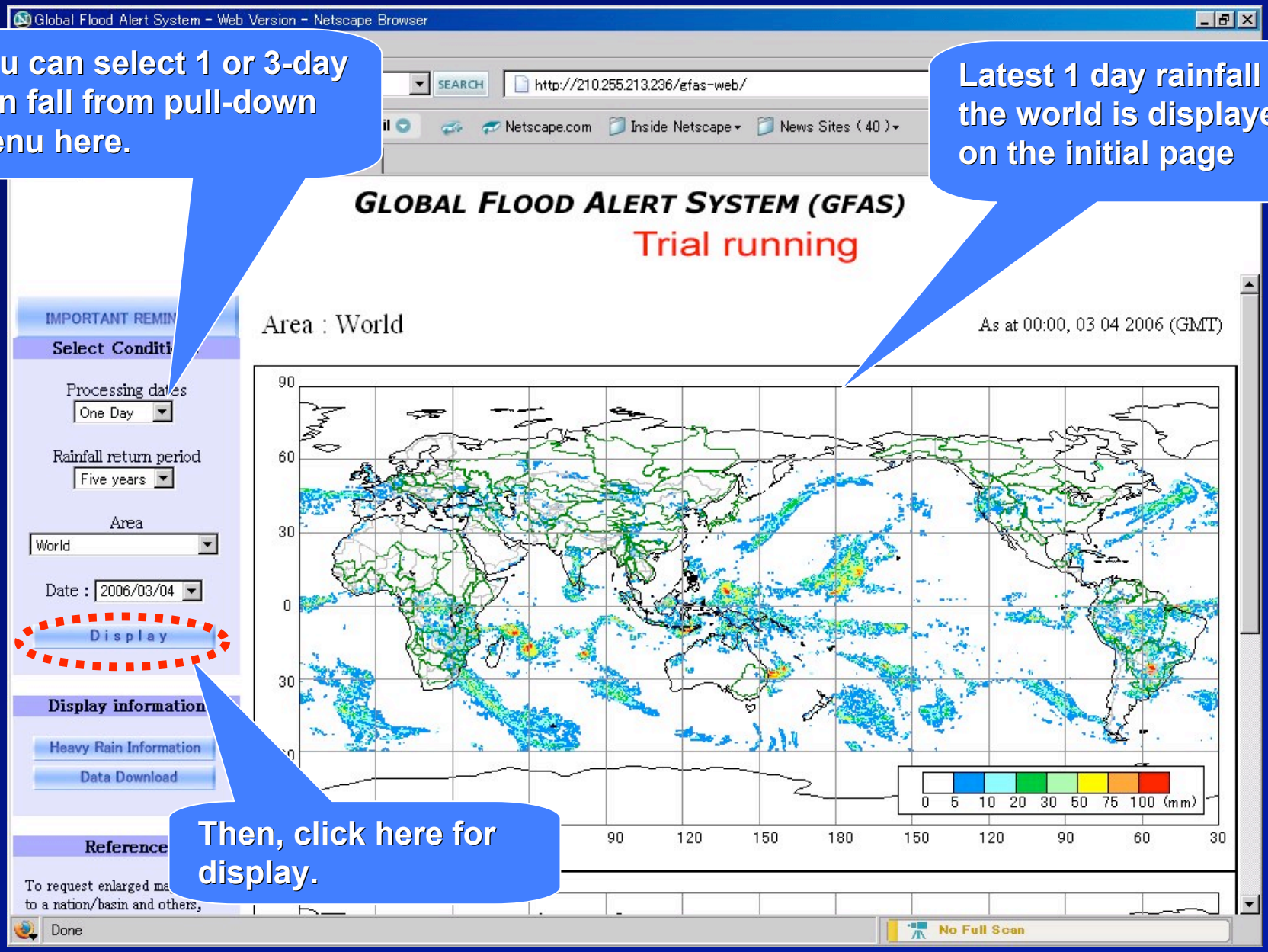
- Rainfall map for single country/river basin
- E-mail delivery of heavy rain notice

E-mail SAMPLE:

Heavy rain information to ZZ basin.
Mean basin precipitation* of YY mm/day, which exceeds 5 year return period rain, was observed.
Please check it on IFNet website !
http://xxxxxxxxxxxxxxxxxxxxx

IFNet Homepage

GFAS starts with daily rainfall

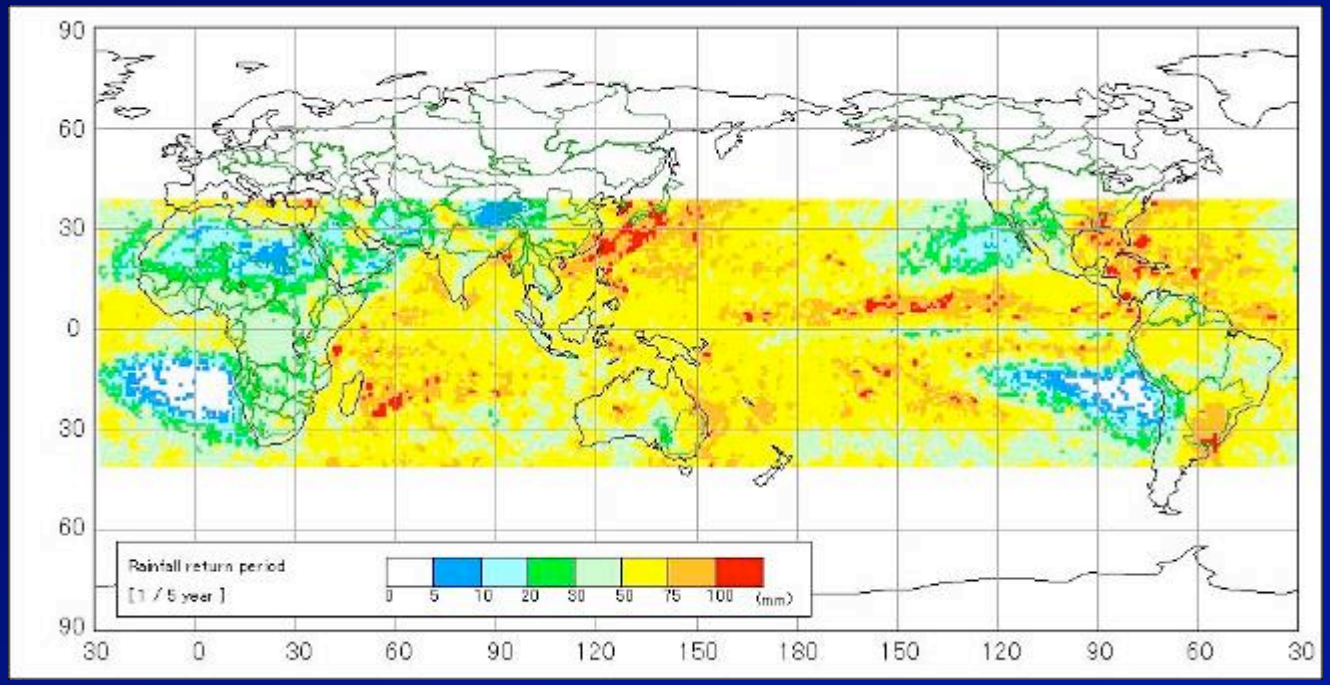


You can select 1 or 3-day rain fall from pull-down menu here.

Latest 1 day rainfall in the world is displayed on the initial page

Then, click here for display.

Probability Rainfall

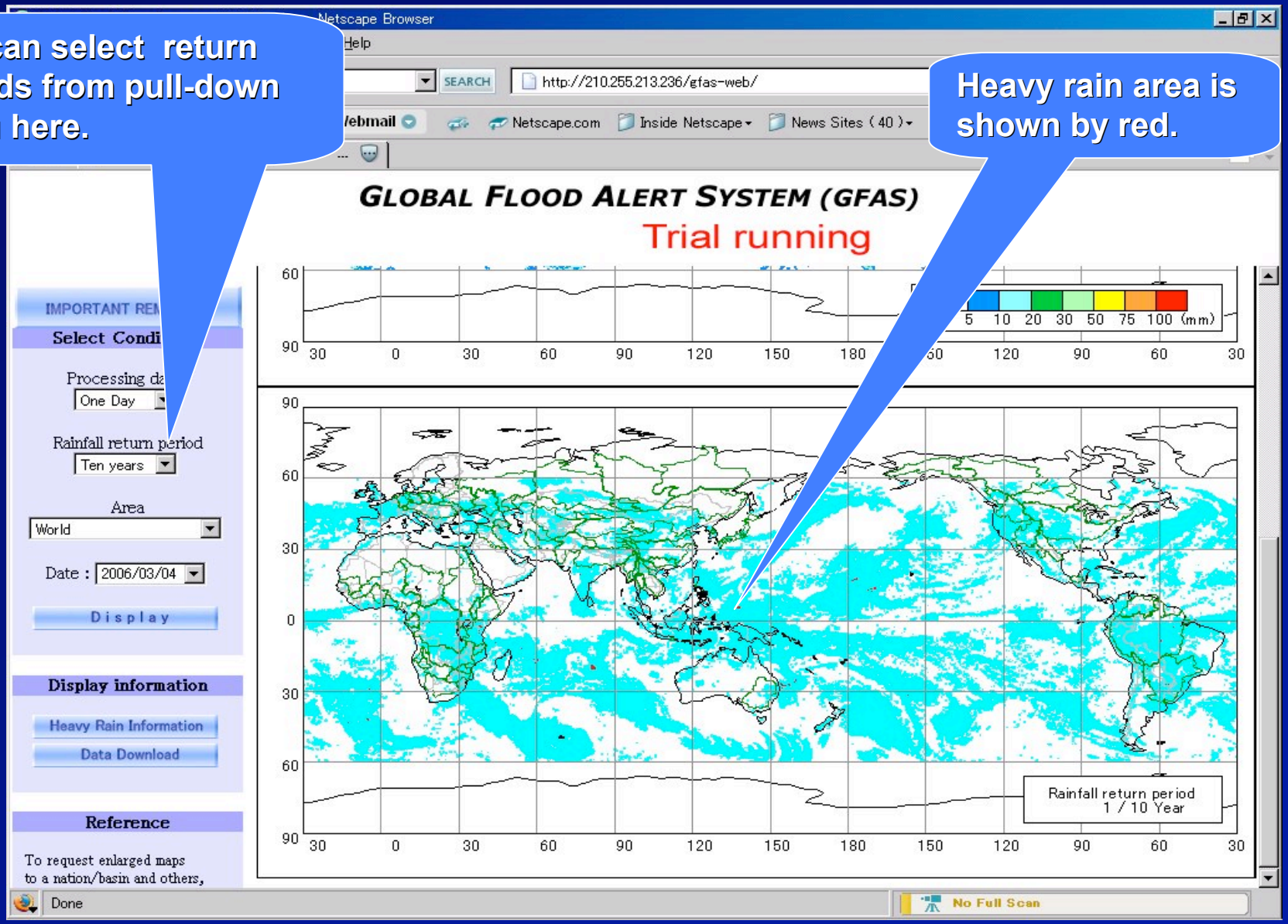


Note:
This is a sample map showing 5 year return period rainfall of 40-40 N-S, but the real map will show in the band of **60-60 N-S**.

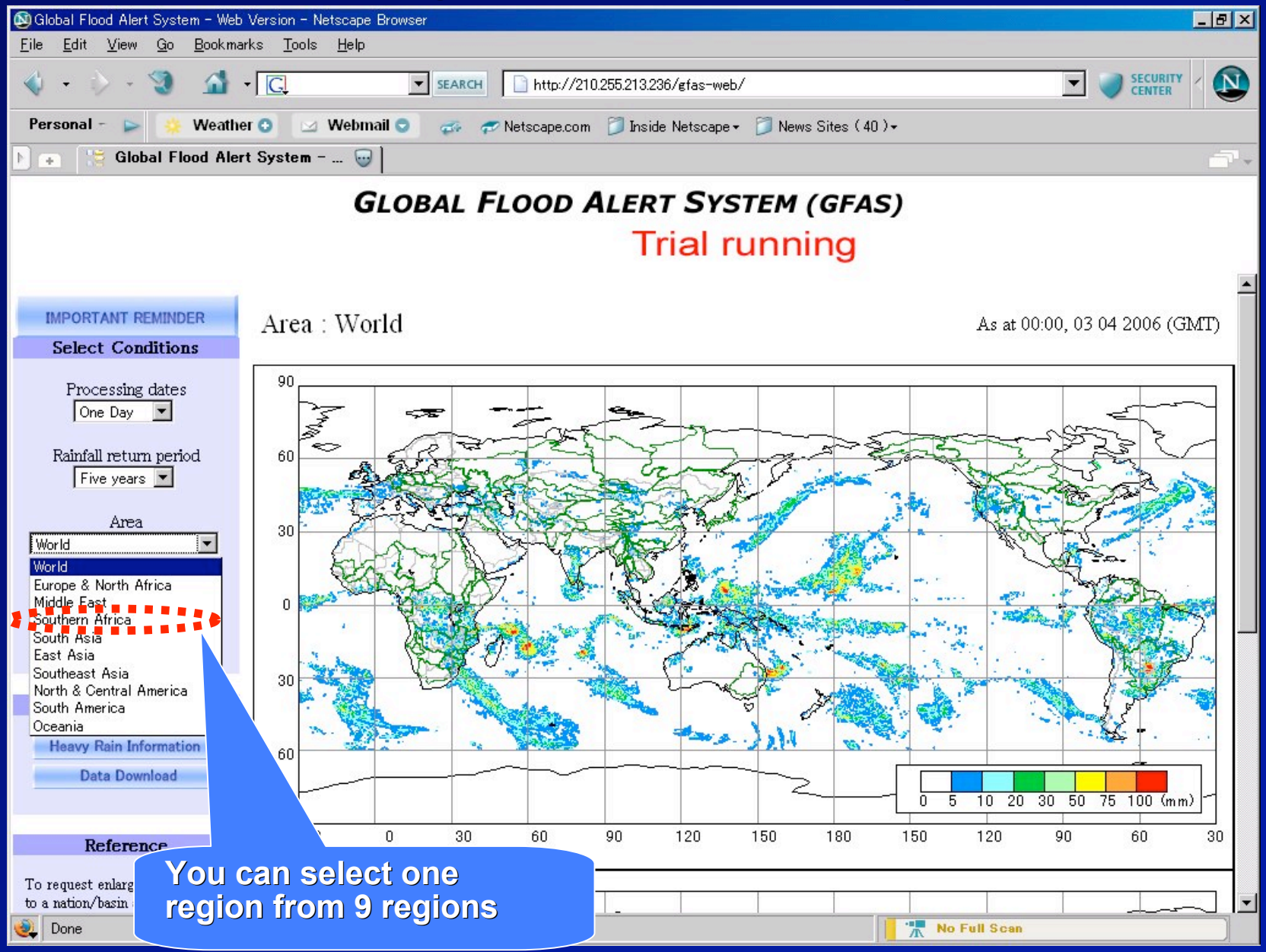
Daily precipitation 5 year return period

Data for calculation: TRMM 3B42(1998-2001) , 3B42RT(2002 –2004)

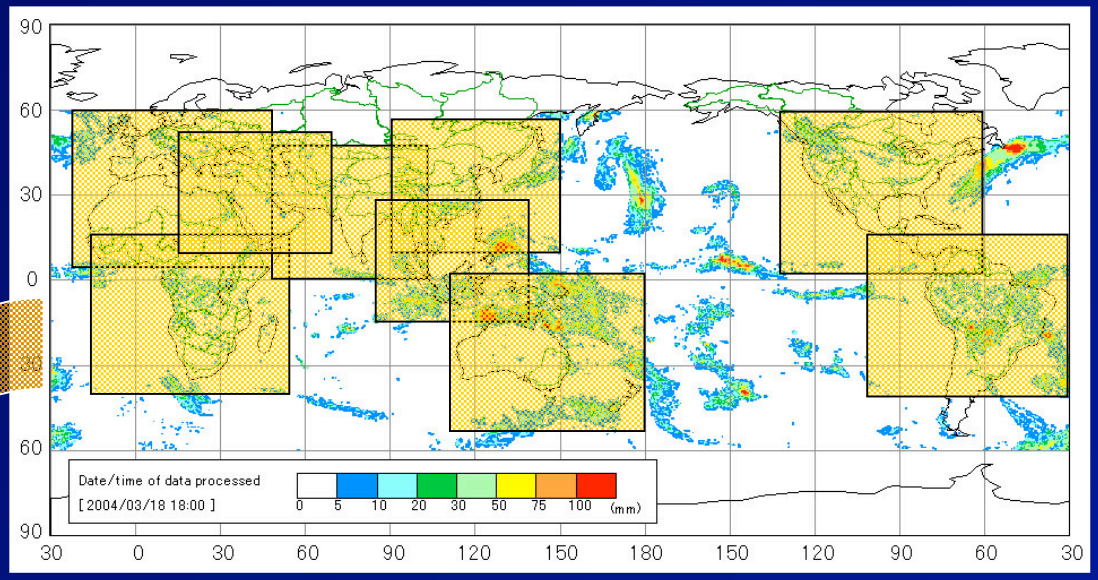
Heavy rain area exceeding 5 or 10-year return period



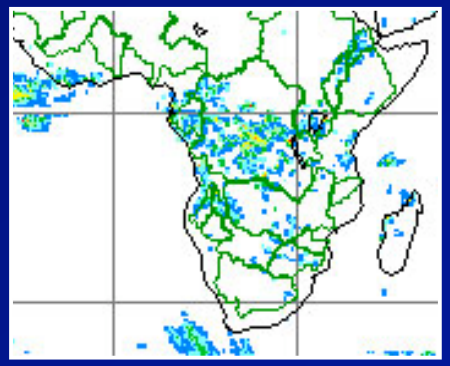
Enlarged maps for 9 Regions

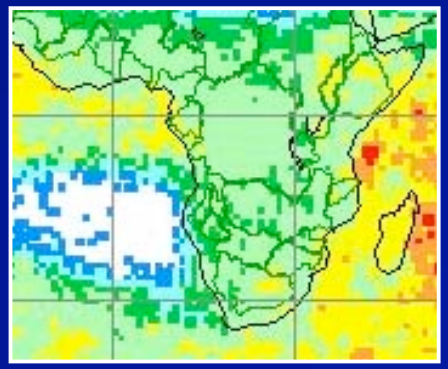


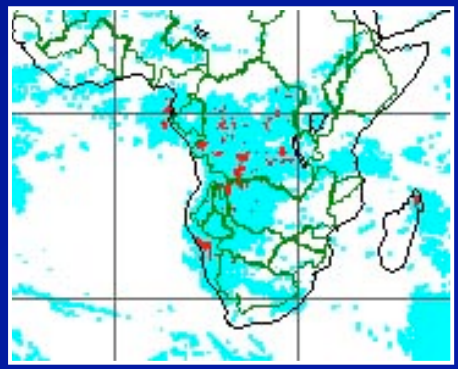
Enlarged maps for 9 Regions



Europe& North Africa
Middle East
South Africa
South Asia
Southeast Asia
East Asia
North America
South America
Oceania

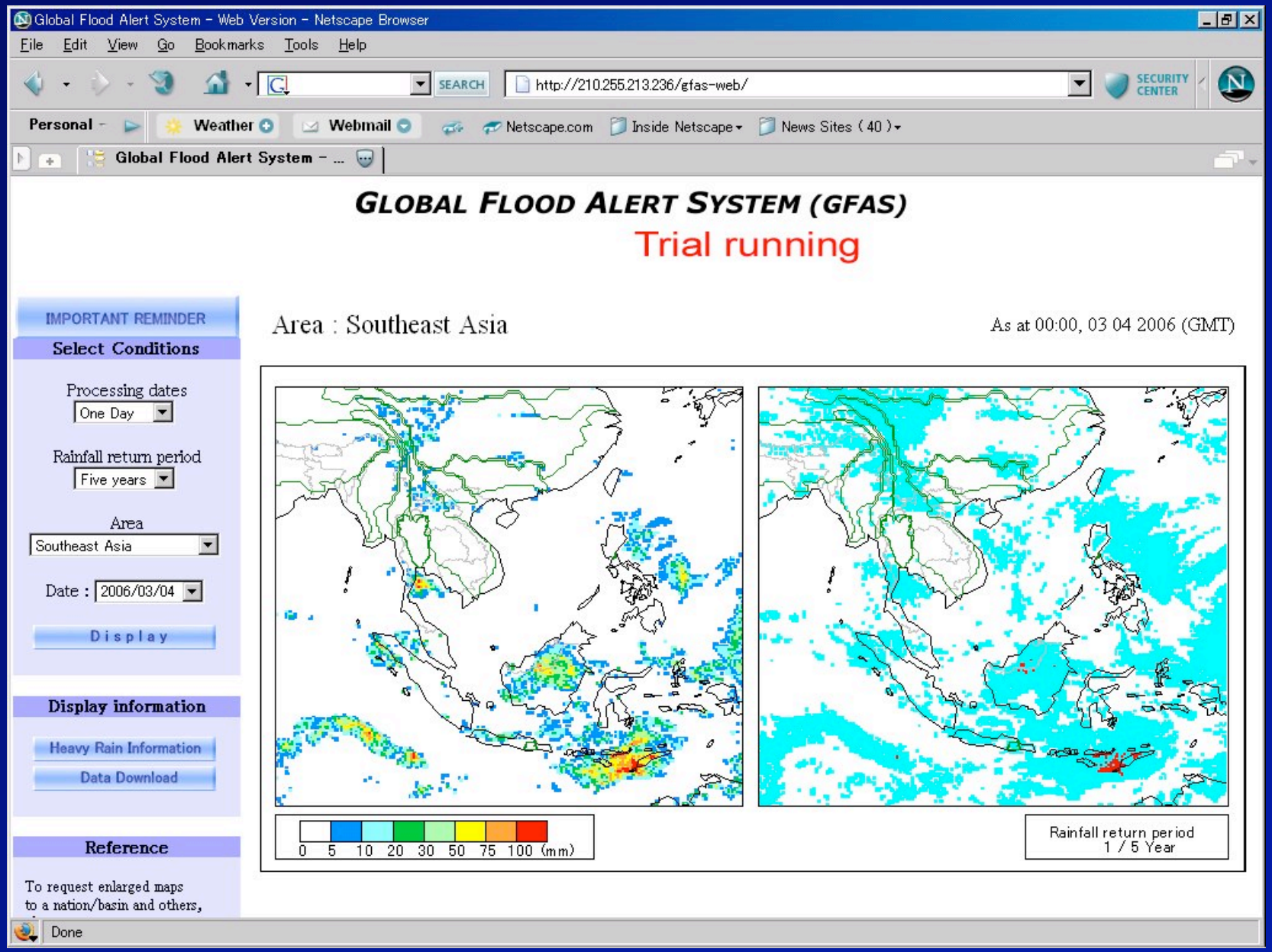




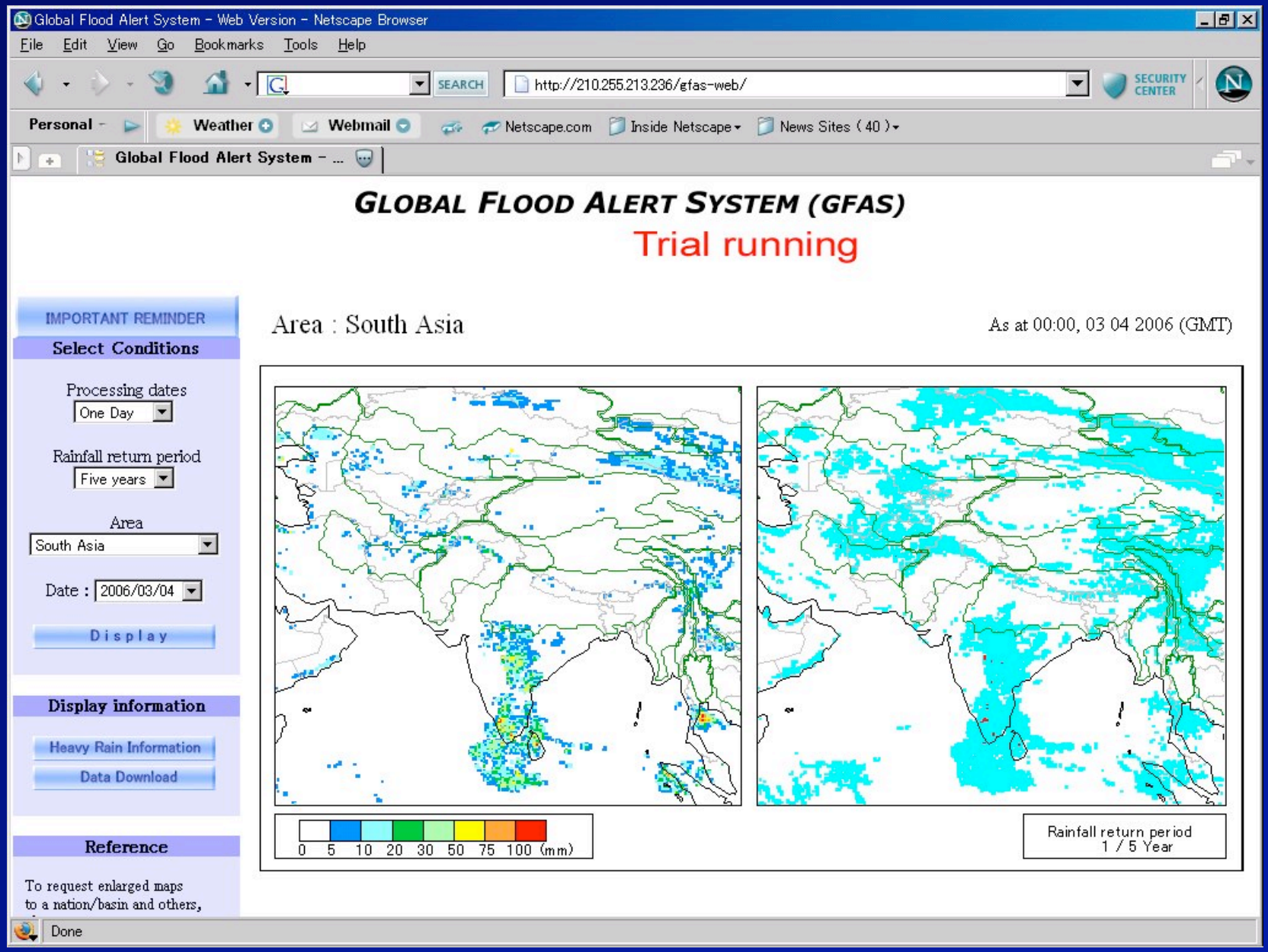


Regional Map Sample (South Africa)

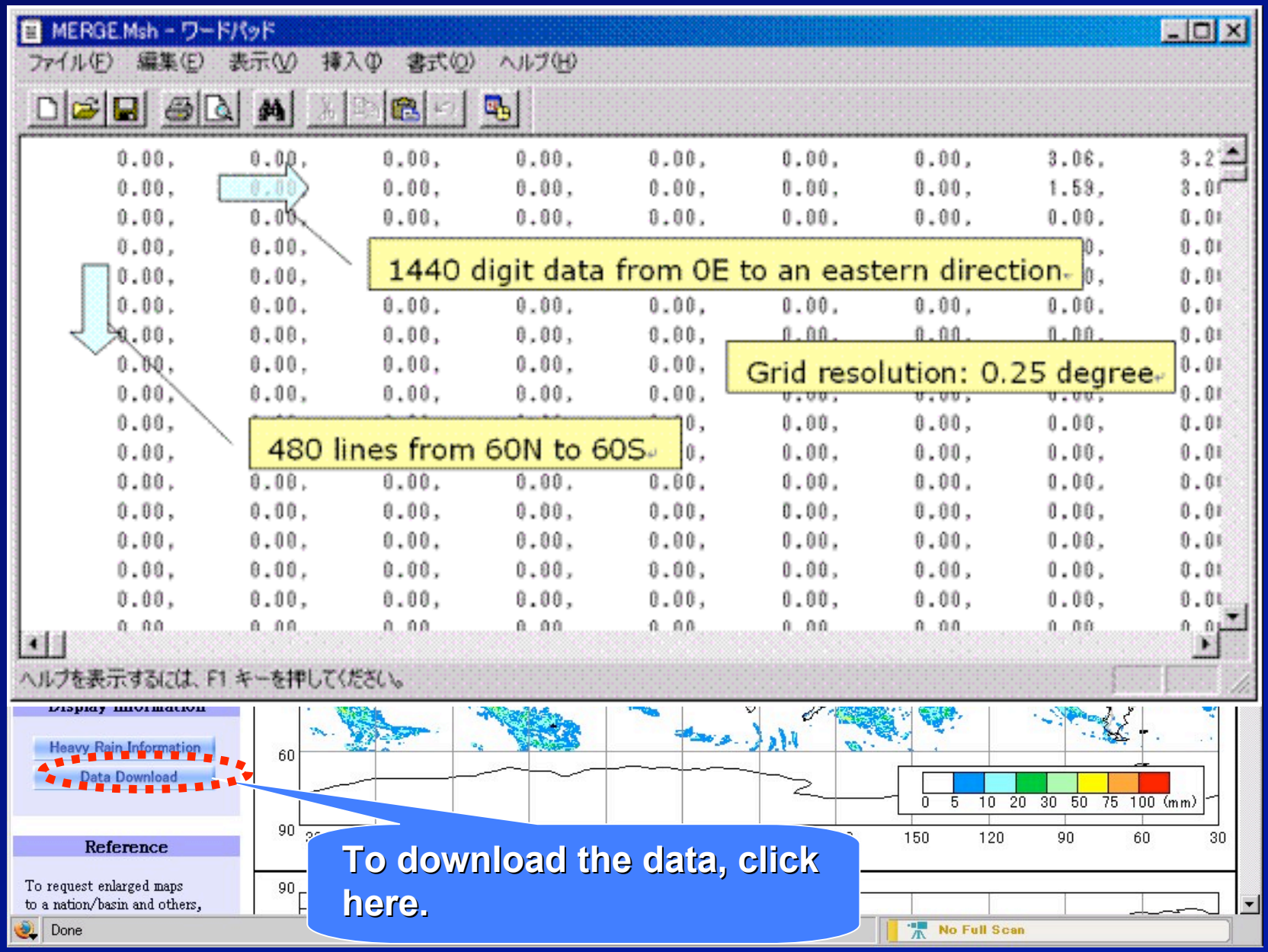
Area: Southeast Asia



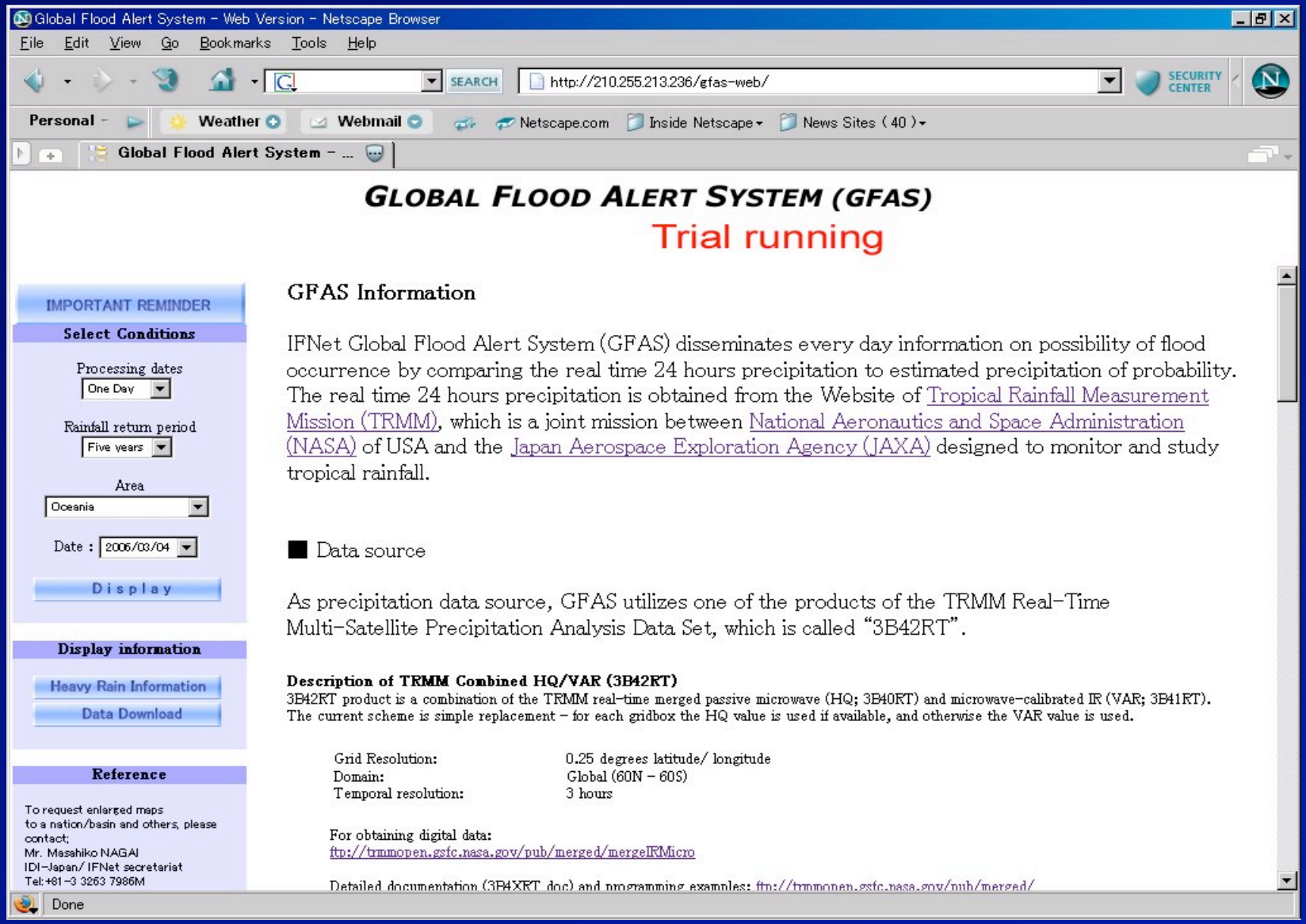
Area: South Asia



Text daily rainfall data available (Excel or Word Pad)



About GFAS (through consultation with NASA)



Future Activities/Vision

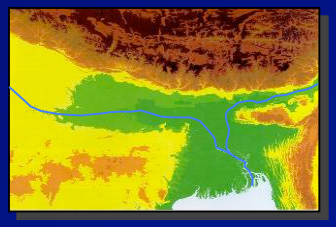
1. Optimization

- Verification for foreign rivers
  Verification of
  - Satellite Rainfall by comparing with ground rain-gauge
  - Rainfall Return Period of 1/5, 1/10 by adding more data

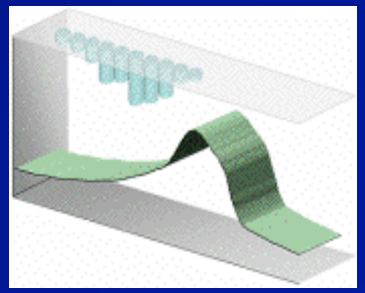
- Response to user's need
  - More enlarged maps for a single river basin
  - Other rainfall period than daily
    (half day, 2 days, 3 days etc.)
  - Other return period than 1/5, 1/10
    (2 years, 30 years etc.)
  - Other criteria for sending e-mail
    (number and place of grid exceeding certain probability, etc.)

2. Use of Satellite Rainfall in Flood Forecasting

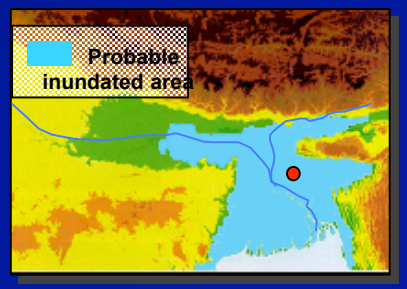
Satellite Rainfall



Global Digital Map



Run-off Analysis



Inundation Area

Thank You

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